

Pyridine Nucleotide Cycle and Trigonelline Synthesis in Developing Leaves and Fruit of *Coffea arabica*

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SUMMARY

We examine the biosynthesis of trigonelline in leaves and fruits of Arabica coffee (*Coffea arabica*) plants. [³H]quinolinic acid, which is an intermediate of *de novo* pyridine nucleotide synthesis, and [¹⁴C]nicotinamide and [¹⁴C]nicotinic acid, which are degradation products of NAD, were converted to trigonelline as well as pyridine nucleotides. These tracer experiments suggest that the pyridine nucleotide cycle, nicotinamide → nicotinic acid → nicotinic acid mononucleotide (NaMN) → nicotinic acid adenine dinucleotide (NaAD) → NAD → nicotinamide mononucleotide (NMN) → nicotinamide, operates in coffee plants, and trigonelline is synthesized from nicotinic acid formed in the cycle. Trigonelline is synthesized and accumulated in leaves and fruits during development. The trigonelline synthesis in pericarps is much higher than that in seeds, but its content in seeds is higher than pericarps, so that some of the trigonelline synthesized in the pericarps may be transported to seeds. Trigonelline synthesis from [¹⁴C]nicotinamide was also found in *Theobroma cacao* plants, but instead of trigonelline, nicotinic acid-glucoside was synthesized from nicotinamide in tea and tobacco plants.